Blackfoot River, Southeast Idaho

P4 PRODUCTION

DRAFT

DATA VALIDATION TECHNICAL MEMORANDUM – REVISION 2

Prepared by

MWH

2353 130th Avenue N.E., Suite 200
Bellevue, Washington 98005

January 2009

M E M O R A N D U M

MWH
2353 130th Avenue N.E., Suite 200
Bellevue, Washington 98005
Phone: (425) 896-6900
Fax: (425) 602-4020

To: Mike Rowe, IDEQ

Date: January 14, 2009

From: Ruth Siegmund

Reference: P4 Production

Subject: Technical Memorandum Addressing Re-Validation and Validation of Historical Data and Future Laboratory and Data Validation Requirements, Southeast Idaho Mine Sites, Revision 2

Dear Mr. Rowe-

Please find enclosed replacement pages for Revision 1 of the Technical Memorandum that addresses the re-validation and validation of historical data and future laboratory and data validation requirements for samples collected at the Southeast Idaho Mine Sites. These insertions will create Revision 2 of the Technical Memorandum. MWH is submitting this document revision on behalf of P_4Production, L.L.C. (P4). We understand that the technical memorandum is considered final.

The following changes were incorporated into Revision 1, submitted November 28, 2008:

- Tables 1 through 3 in Attachment B (Future Data) and Tables 1 through 6 in Attachment C (Historic Data) were revised to address qualification of field sample results associated with blank contamination in the specific case when the field sample value was detected between the method detection limit and reporting limit. Data validation report templates (Attachments D and E) were also revised to reflect this change.

- The interference check sample A (ICSA) and serial dilution acceptance criteria and data validation references on Tables 1 and 3 in Attachment C (Historic Data) were corrected and are consistent with the data validation report templates.

- The data validation references for the laboratory fortified blank and matrix spike sample on Tables 5 and 6 in Attachment C were revised to be consistent with the control limits referenced in the data validation report templates.

- Data validation report template cover sheets (Attachments D and E) were revised to eliminate redundant information and include laboratory identifications.

- The laboratory control sample and matrix spike sample sections of the data validation report templates (Attachments D and E) were revised to include the following statement, “Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration.”

- The data validation electronic data deliverable specifications table (Attachment F) was revised to include a reference to GeoTracker.

The following changes are incorporated into Revision 2:

- The data validation report template for mercury by cold vapor atomic absorption (Attachment E) was revised to include (a) review criteria for low-level calibration verification standards, and (b) create that the flagging of associated data applied only when unspiked sample concentration is less four times the spike amount.

- Section 6 was revised to incorporate an evaluation process for field replicate results.

The insertions are as follows from front to back:

- New binding cover and spine inserts replaces exiting cover and spine (these have been revised to indicate “Revision 2,” and update the publication date to January 2009).

- New CD replaces existing CD in protective pocket.

- New pages 1 through 9 (Revision 2) replaces existing pages 1 through 8 (Revision 1) – these have been revised to indicate “Revision 2,” and update the publication date to January 2009.

- New data validation report template for “Mercury by CVAA EPA method 7470A” in existing Attachment E replaces existing data validation report template for mercury (six pages).

These replacement items have been submitted according to the distribution list below.

Distribution List:

Hard copy and electronic version:

Mike Rowe, Doug Tanner*,
Bruce Olenick*, Trina Judkins*, IDEQ
Gerry Winter, IDEQ
Jeff Jones, Mary Kauffman, Will Frymire*, USFS
Jason Sturm, BLM
Kelly Wright, Shoshone-Bannock Tribes
Cary Foulk, MWH
Tim Mosko, CH2M Hill
Diane Short, DSA
Sandi Arena, USFWS
Lorraine Edmond, USEPA
Dave Tomten, USEPA
Allen Ruberry, IDL
Bill Wiley, BIA
Bob Geddes, Monsanto
Barry Koch, Monsanto
Dave Farnsworth, Monsanto
Artemis Antipas, CH2M Hill
Randy White, Monsanto
Dale Ralston, RHS

Electronic version only:

Joe Wallace, USEPA
Jim McCulloch, Monsanto
Mike Vice, Monsanto
Patrick McCullough, Monsanto
Don Wind, Monsanto
Paul Stenhouse, Monsanto

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1.0 INTRODUCTION

On June 30, 2008, the Idaho Department of Environmental Quality (IDEQ) issued a letter to P4 Production, LLC (P4) on behalf of the Agencies/Tribes providing oversight on the Southeast Idaho Mine Sites stating that the data validation reports associated with data collected between 2004 and 2006 and presented in the *May 2006 Data Validation Report, October 2005 Groundwater Data Validating Report Memorandum*, and the *Phase I Site Investigation Summary Report* were deficient.

IDEQ contracted Diane Short & Associates (DSA) to review a subset (approximately 10 percent) of the analytical data generated by ACZ Laboratories, Inc. (ACZ), located in Colorado Springs, Colorado, from samples collected for the May 2004 through May 2006 sampling events at the Southeast Idaho Mine Sites. DSA provided a Summary of Independent Validation Findings (titled "Idaho Department of Quality, P4 Production Southeast Idaho Mine Sites, Summary of Independent Validation Findings," provided as Attachment 4 to the IDEQ letter from Mike Rowe dated June 30, 2008) and a Data Validation Comparison Report (titled "Idaho Department of Quality, P4 Production Southeast Idaho Mine sites, Data Validation Comparison," provided as Attachment 3 to the letter and electronic data deliverable [EDDs] provided via email dated July 9, 2008).

P4 issued comments on the DSA reports, as well as responses to the USEPA Region 10 comments (included as Attachment 5 of the IDEQ letter), on July 17, 2008. A conference call was conducted on July 28, 2008 to address the IDEQ's requirement to re-validate the data associated with the P4 reports. A meeting was conducted on August 20, 2008 at the IDEQ office in Boise, ID to come to agreement on issues related to re-validation of data and to establish a plan for analysis and data validation of future samples.

This technical memorandum documents the agreements made at the August 20, 2008 meeting. It documents (a) the deficiencies identified by the Agencies/Tribes in laboratory data deliverables and data validation reports and agreements to address deficiencies, and (b) the lack of sufficient detail noted by the Agencies/Tribes in the existing, approved Sampling and Analysis Plan (SAP; MWH 2004) for laboratory deliverables and data validation reports. This technical memorandum provides all the materials needed by the approved 3rd party data validator, Laboratory Data Consultants, Inc. (LDC), to re-validate historical data and validate historical data not yet validated. It also provides some of the materials needed for laboratory analysis and data validation of future sampling and references a separate deliverable, a Quality Assurance Project Plan (QAPP) Addendum, to addend the existing SAP, which will document all agreed-upon changes to the sampling and analysis program.

2.0 DEFINITION OF DATASETS

Sampling and analysis of sediment, soil, animal and plant tissue, groundwater, and surface water were conducted between 2004 and spring 2008. Data generated between 2004 and 2006 were validated and reported. Data generated in 2007 and spring 2008 have not been validated or reported. These two datasets will collectively be referred to as the historical data. Sampling and analysis of surface water and groundwater is on-going, with the most recent event having been completed in

September 2008. Analytical results from the September 2008 samples, and any future sampling, will be referred to as the future data.

3.0 LABORATORY ANALYSIS AND DATA DELIVERABLES

Historical ACZ Data Packages

ACZ analyzed sediment, soil, animal and plant tissue, groundwater, and surface water samples collected from the Southeast Idaho Mine Sites from 2004 through spring 2008. To address the deficiencies noted by the Agencies/Tribes, P4 will implement the following:

- The Agencies/Tribes noted that ACZ's data packages were not well organized and were difficult to validate. A subset of ACZ laboratory data packages will be reproduced in hard copy for the project record so that other interested parties may use these reports as templates to navigate all data packages. For each of these reports, the hard copy will be paginated and a table of contents (TOC) will be produced for the data package identifying the page locations of results and quality control (QC) information (e.g., preparation and analytical logs, QC summaries, initial calibrations, tuning, ICPMS internal standards).
- One data package for each sample matrix (surface water/groundwater and soil/sediment; tissue, if applicable to that year) will be produced as described above for the following:

  – Initial and final sampling events in 2004
  – Middle sampling events in 2005, 2006, and 2007
  – Spring 2008 sampling event

- The DSA report noted that sediment, soil, and tissue samples values that were detected between the method detection limit (MDL) and reporting limit (RL) and above the RL (i.e., the "hits") were reported as moisture- and dilution-adjusted values, but the RLs associated with the "non-detected" results were not moisture- and dilution-adjusted. However, as of the writing of this technical memorandum, it is unclear whether the statement regarding NDs is accurate. If it is found to be the case that RLs associated with NDs were not appropriately adjusted, then P4 will request ACZ to provide revised sample results sheets containing moisture- and dilution-adjusted RLs for the "non-detected" results. If ACZ does not provide revised results sheets in a timely manner, then the laboratory-provided electronic data deliverables (EDDs) will be updated to include a new column for moisture- and dilution-adjusted reporting limits for non-detected results, and these tables will be printed out in hard copy and attached to the hard copy report that is retained by MWH. The moisture- and dilution-adjusted RLs for the "non-detected" results will be included in the future project database (see Section 7).

Future Laboratory Data Deliverables

Requirements specified below are summarized on the hard-copy deliverable and EDD requirements provided in Attachment A.

- The hard copy report will be paginated and accompanied by a TOC.
- The hard copy will contain a detailed case narrative itemizing QC elements that were outside acceptance criteria accompanied by a description of any corrective action that was implemented or rationale why corrective action was not implemented.
- An analytical result will be reported as either (a) a detected value, either between the method detection limit (MDL) and reporting limit (RL) for metals or above the RL for metals and other inorganic parameters, or (b) as a non-detected (ND) result at the reported MDL and RL. Detected values and RLs will be moisture- and dilution-adjusted.
- The hard copy will contain QC summary information similar in content and general format as specified in the Contract Laboratory Program (CLP) Statement of Work for ILM05.3 (Cover Page, Forms 1A-IN through XV-IN, and login forms).
- For approximately 90% of samples collected, hard-copy reports will be issued with summary data (referred to as a Level 3 package), and the remaining hard-copy reports will be issued with summary data and back-up raw instrument data (referred to as a Level 4 package). Raw data for all reports will be issued in scanned format (e.g., pdf).
- Laboratory EDDs will contain more detailed data, including QC batch sample results (see specifications for MWH's EDD and GeoTracker EDF provided in Attachment A).

Future Analytical Requirements

Requirements specified below are summarized on the QC and calibration tables for EPA Method 6020A, 6010B/C, and 7470A/7471A provided in Attachment B.

- Selenium will be analyzed using ICPMS (6020A) instead of Atomic Absorption (AA)-Hydride (SM3114B).
- All ICPMS analyses (water and solid-matrices) will be conducted using EPA Method 6020A; ICP using EPA Method 6010B/C; and cold vapor atomic absorption (CVAA) using EPA Method 7470A (water)/7471A (soil).
- Low-level spike standards will be required for 6020A, 6010B/C, and 7470A/7471A. Results of low-level initial calibration verification standard (LLIVS) will be reported using CLP Form IIB-IN or equivalent.
- Serial dilutions will be required for 6020A and 6010B/C. Results of serial dilutions will be reported using CLP Form VIII-IN or equivalent.
- Interference check standards will be required for 6020A and 6010B/C. Results for interference check standards will be reported using CLP Forms IVA-IN and IVB-IN or equivalent.

4.0 DATA VALIDATION

Data Validation Requirements for Historical Data

- The analytical requirements ACZ used to generate the historical data are summarized on the QC and calibration tables provided in Attachment C.

- Data validation already performed and reported for wet chemistry analyses (anions, alkalinity, etc.) is acceptable as performed and reported. Metals data generated using ICPMS, ICP, CVAA, and AA-Hydride will be re-validated using the general protocol and process described in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (NFG; USEPA, 2004) as applicable to the methods specified in the SAP and used by ACZ. LDC will document the data validation process using the templates provided in Attachment D.
- Level 3 data validation will be performed on approximately 90% of samples; this includes addressing all the NFG protocols as applicable to the method with the exception of an example calculation from raw data. Level 4 data validation will be conducted on the remaining 10% of samples, and this will included an example calculation, with the caveat that if there is any problem with the recalculation, then corrective action would include correction of any analytical error and reissuing of data.
- LDC will populate validated data in each individual Excel file (EDD) provided with each ACZ laboratory report. LDC will add three columns to each AZC EDD and populate as follows:

  – Field Header "USEPA Flag": Populate with EPA flags specified in template report.
  – Field Header "Reason Code": Populate with all applicable Reason Codes specified in template report.
  – Field Header "Final Result": Populate with the final, qualified result, including any adjustment based on blank contamination.

Data Validation Requirements for Future Datasets

- Future datasets will be validated using the general protocol and process described in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (NFG; USEPA, 2004) as applicable to the methods specified in the QAPP Addendum. Validation will be documented using the templates provided in Attachment E.
- Level 3 data validation will be performed on approximately 90% of samples; this includes addressing all the NFG protocols as applicable to the method with the exception of an example calculation from raw data. Level 4 data validation will be conducted on the remaining 10% of samples, and this will included an example calculation, with the caveat that if there is any problem with the recalculation, then corrective action would include correction of any analytical error and reissuing of data.
- An MWH Environmental Restoration Program Information Management System (ERPIMS) Enhanced EDD or GeoTracker EDF will be provided to the validators to populate (see specifications provided in Attachment F).

5.0 QAPP ADDENDUM

A QAPP Addendum to the SAP (MWH, 2004) will be issued as a separate deliverable to document changes to the sampling and analysis plan and provide laboratory deliverable

and data validation requirements for future sampling and analysis events. This QAPP Addendum will contain the following:

- Requirements for equipment rinsate (ER) sample collection. ER will be collected on a daily basis (except where dedicated sampling equipment are used, in which case an ER is not required), and associated field samples will be qualified per NFG method blank data validation protocols.
- Selenium will be analyzed using ICPMS (6020A) instead of Atomic Absorption (AA)-Hydride (SM3114B).
- List of requirements for laboratory data package hard copy and specification for EDDs (as specified in Attachment A).
- QC, calibration, and corrective action requirements for ICPMS (6020A), ICP (6010B/C), CVAA (7740A/7741A), gas flow proportional counting system (GFPCS) 900.0, and other wet chemistry (see Attachment B for ICPMS, ICP, and CVAA).
- Data validation specification, including data validation report templates, for ICPMS, ICP, CVAA, GFPCS, and other wet chemistry (see Attachment E for ICPMS, ICP, and CVAA).

6.0 REVISIONS OF REPORTS

Data generated between 2004 and 2006 will be re-validated and LDC will populate ACZ's EDDs with the final, qualified data as discussed in Section 4. Data tables that were generated for the reports referenced in the introduction will be revised to include the re-validated data.

Field replicate samples will be validated as individual samples. The precision of the field replicates will not be assessed in the data validation reports. Rather, each parameter of the field replicate samples and its applicable project screening values will be tabulated and presented in the report of investigation, along with one of the following calculation:

- The relative percent difference (RPD) between two values: If one of the three field replicate results is not detected for the tested parameter, then the RPD for the two remaining results will be calculated. However, if one or both the detected values are less than the reporting limit, then the absolute difference between the values will be calculated.
- The percent relative standard deviation (%RSD): If all the replicates are detected for the given parameter and all values are greater than their reporting limits, then a %RSD will be calculated.

RPDs, absolute differences, and %RSDs will not be calculated for other result scenarios. The data users will need to take into account the field replicate variability when assessing trends and/or decisions made with respect to field sample results. For example, if there a result near its project screening value, and it is associated with field replicates that have elevated variability (as compared to the results of other field replicate samples), then the data user may recommend additional sampling to reduce uncertainty at this location or evaluate precision trends at the associated location or in samples of a similar geochemical composition at the site.

7.0 PROJECT DATABASE

A project database will be designed with fields specified in the EDD requirements for future deliverables (Attachment A). The historic data will be uploaded using the available electronic data provided in ACZ's EDDs. The EPA flags, Reason Codes, and final, qualified data will be uploaded from the EDDs that LDC will populate as discussed in Section 4. Future laboratory electronic data will be generated using the specifications provided in Attachment A, and future validated electronic data will be generated using the specifications provided in Attachment F.

8.0 REFERENCES

MWH, 2004. *Southeast Idaho Mine-Specific Selenium Program, Comprehensive Site Investigation Sampling and Analysis Plan, Final*. April.

United States Environmental Protection Agency (USEPA), 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October.

ATTACHMENT A

Hard-Copy and EDD Requirements for Future Laboratory Deliverables

DATA VALIDATION PACKAGE

The following list of deliverables meet the regulatory criteria of most projects and allows for the most productive and efficient data validation and data usability assessment. Depending on the lab, some of these items may be considered a custom item. To the extent possible, client samples should be batched together so that they can be run with the minimum number of days of preparation and analysis and with only one instrument per method and matrix. The package deliverable should be collated with the Result forms (CLP Form I type of reporting) up front along with the narrative. Data for each method is to be on a separate page for results and for QC summary sheets. The package can then include summary QC by method or the QC summary can be included with each method. The package should contain dividers or some visible means to segregate data by method. Standard procedure is to have one data package contain 20 samples or less, all of which are associated with only 1 or 2 preparation or analysis days and one instrument per method.

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Sample Summary

1) A sample summary that correlates lab sample # and the client sample number
2) Some labs may also have sampling dates and times

Case Narrative

1) A Case Narrative which is accurate and discusses:
   a) any sample receipt issues
   b) corrective actions taken and
   c) QC outliers or other problems, method deviations or clarifications observed by the lab.

Form 1's (Sample Data Sheets with compounds and results listed)

1) Form I's up front with the narrative or in front of the associated method rather than scattered through the raw data.
2) Form I's to contain the following:
   a) client sample number
   b) lab sample number
   c) sample results and appropriate units, MDL (IDL) and RL. Result must be reported, not ND. If undetected report as MDL 'U'
   d) sampling and receipt dates
   e) prep date/time (if necessary)
   f) analysis date/time (if multiple runs for a sample)
   g) dilution factor
   h) prep (QC) batch number (for tracking prep QC);
   i) run batch number if available(for tracking calibrations, etc);
   j) matrix, and instrument (only if more than one instrument used for this method)
   k) % moisture should be shown if appropriate
   l) Prep information is good to have on the Form 1's but is not necessary if provided in legible and understandable bench sheets or prep reports;
3) Other summary forms need to be present, right behind the Form Is with clear association of QC batch to samples:

Summary Forms General to all Methods

   a) Method or preparation blank results, reported to MDL (IDL)
   b) LCS recovery forms
   c) MS/MSD forms (including parent sample ID , concentration and spike amount, % R and % RPD)

As part of full package

   d) Complete chain of custody documentation, including shipping records and lab receipt forms need to be present somewhere in the package where they can be easily found.

e) Any client communication or corrective action

Organic Data Summary Forms

f) surrogate recovery forms (unless shown on the Form 1's)
g) Internal standard area summaries
h) ICAL forms, and the continuing cal (CCV) forms;
   - RRFs for GCMS methods: Even though these RRFs are not used for calculation, they are used in validation as indicators of instrument sensitivity for a particular target = RRFs as well as % drift reports, the RF for the CCAL and regression statistics and the %D reports for targets calibrated by regression analysis
   - All targets must have either RF % difference reports or % drift reports and RFs should be available.
i) The ICAL's and CCV's are arranged in the package in such a way that it is easy to know which samples go with which calibrations.
   - Either by analysis time, date and instrument number on Form 1's or;
   - A cover page with indicated batch number and samples numbers followed by the corresponding calibration reports in a section with raw data.

Organic Raw data (sometimes the calibration data are in the raw data only, this is acceptable)

j) The raw data should be organized in a logical form which is easy to follow after all these forms
k) Raw data includes GC/MS: reconstructed ion chromatograms (RICs), spectra and quantitation reports with Retention times. For GC: chromatograms, quantitation reports with Retention times, 2 column confirmation data (summarized for %D of the 2 column results if %D > 25%)

Inorganic Data Summary Forms

l) Initial and continuing calibration blanks with results to the IDL
m) Initial and continuing calibration verification (ICV, CCV) with % recoveries or % RPD for ICPMS
n) ICP Interference Check Sample (ICS) recoveries
o) Matrix duplicate, if required with parent sample, duplicate and RPD
p) Serial dilution % differences and parent ID
q) Low level standard check (CRDL standard)
r) MDLs and PQLs or RLs
s) ICV, CCV linear regressions for mercury or wet chemistry (this may be a raw data deliverable for some methods)
t) GFAA analytical spikes and MSA as required (this may be a raw data deliverable)

Inorganic Raw data

u) All inorganic methods: full raw data print outs from instruments
v) Full run log for each analysis

ICPMS to include:

w) internal standard recoveries (in summary form if available)
x) Tune (amu and peak width)
y) oxide and molecular interference check data

Notes on Chain of Custody Procedures

The basic principle to keep in mind is that there must be an unbroken record of possession. This is to ensure that tampering with samples did not occur prior to analysis, and chain of custody defects are among the first things attacked in court cases. It is important to also understand that chain of custody records do not have to be only one document. Shipping company records, field records of other kinds, and lab internal records are also part of the record of custody.

An example scenario might be if a sampler took the samples, then signed the chain as having done so. If the samples are then stored in a secure location a properly signed and dated record of this should be provided. This would normally be on the chain of custody form used in the field. If there is not a secure location then the samples should be kept in the presence of a responsible party who has signed the custody document as having taken custody. All dates and times should match for relinquishment and receipt.

If the cooler is sealed, with the CoC inside, this should be documented on the chain of custody. Then, when the samples are shipped, additional documentation needs to have signatures affixed. This can be the shipping documents, showing that the shipping company took custody of the samples, but the identification of the samples needs to be clear. The CofC #, cooler #, or some form of clear identification should be present on these forms, and they should be signed off by the person having custody up until shipment. Then, when the coolers are received by the lab, the shipping documentation should be made available so that the unbroken chain of custody can be documented. When the cooler is opened, then the lab would sign the chain of custody within.

It is better to sign and date the chain when the cooler is shipped. This would, however, require either unsealing the cooler and resealing it (with appropriate documentation), or keeping it in a secure location unsealed until shipment, signing the chain and sealing the cooler at that time.

A wide variety of strategies are feasible, as long as the principle of an unbroken chain of custody is maintained.

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
(Page 1 of 8)

TABLE A-1: MWH ENHANCED ERPIMS 4.0 EDD FORMAT

MWH's standard database format requires a single delimited text file that meets the specifications and size constraints outlined below. * *A comma delimited file is required*, but an acceptable alternative may be used as long as it meets the same specifications and is O.K.ed prior to the first data submittal. ***It is required that all fields must be provided in the order listed below, regardless if the field is populated or left NULL.*** Any variations need to be discussed with the Project Database Manager.

Col	Field Name	Format	Description	Envision Field	Reference	Constraints
1	AFIID	C5 (Valid Value List)	USAF Installation Code	AF_ID	ERPIMS 4.0 DLH	Not null
2	LABSAMPID	C12	Lab Sample Identifier	LAB_SAMP_ID	ERPIMS 4.0 DLH	Not null
3	LOCID	C15	Location Name	LOC_ID	ERPIMS 4.0 DLH	Not null
4	MATRIX	C2 (Valid Value List)	Sampling Matrix	MATRIX_CODE	ERPIMS 4.0 DLH	Not null
5	SBD	N7,2	Sample Beginning Depth	TOP_DEPTH	ERPIMS 4.0 DLH	Not null
6	SED	N7,2	Sample Ending Depth	BOT_DEPTH	ERPIMS 4.0 DLH	Not null
7	LOGDATE	D (DD-MMM-YYYY)	Sample Date	SAMP_DATE	ERPIMS 4.0 DLH	Not null
8	LOGTIME	C4 (HHMM)	Sample Time	SAMP_TIME	ERPIMS 4.0 DLH	Not null
9	LABCODE	C4 (Valid Value List)	USAF Lab Identifier	LAB_CODE	ERPIMS 4.0 DLH	Not null
10	SACODE	C2 (Valid Value List)	Sample Type	SAMP_TYPE	ERPIMS 4.0 DLH	Not null
11	SAMPNO	N2 (1-99)	Sample Number	SAMP_NO	ERPIMS 4.0 DLH	Not null
12	ANMCODE	C7 (Valid Value List)	Analytical Method Code	ANAL_CODE	ERPIMS 4.0 DLH	Not null
13	EXMCODE	C7 (Valid Value List)	Extraction Method Code	PREP_CODE	ERPIMS 4.0 DLH	Not null
14	EXTDATE	D (DD-MMM-YYYY)	Extraction Date	PREP_DATE	ERPIMS 4.0 DLH	Conditional[9]
15	EXTTIME	C4 (HHMM)	Extraction Time	PREP_TIME	ERPIMS 4.0 DLH	Conditional[9]
16	ANADATE	D (DD-MMM-YYYY)	Analysis Date	ANAL_DATE	ERPIMS 4.0 DLH	Not null
17	ANATIME	C4 (HHMM)	Analysis Time	ANAL_TIME	ERPIMS 4.0 DLH	Not null
18	LABLOTCTL	C10	Laboratory Preparation Batch ID	PREP_LOT	ERPIMS 4.0 DLH	Conditional[9]
19	PARLABEL	C12 (Valid Value List)	Parameter Label	CHEM_CODE	ERPIMS 4.0 DLH	Not null
20	PARVAL	N14,4	Measured Concentration	RESULT	ERPIMS 4.0 DLH	Not null
21	UNITS	C10 (Valid Value List)	Units of Measure	UNITS	ERPIMS 4.0 DLH	Not null
22	PARVQ	C2 (Valid Value List)	Parameter Value Qualifier	PAR_VQ	ERPIMS 4.0 DLH	Not null
23	BASIS	C1 (Valid Value List)	Wet or Dry Basis (for soil data)	BASIS	ERPIMS 4.0 DLH	Not null
24	DILUTION	N8	Dilution Factor	DIL_FACT	ERPIMS 4.0 DLH	Not null
25	LOGCODE	C4 (Valid Value List)	Logging Company Code	LOG_CODE	ERPIMS 4.0 DLH	Not null
26	SMCODE	C2 (Valid Value List)	Sampling Method Code	SM_CODE	ERPIMS 4.0 DLH	Not null
27	FLDSAMPID	C30	Field Sample ID	FIELD_ID	ERPIMS 4.0 DLH	Conditional[10]
28	COCID	C12	Chain of Custody ID	COC_NO	ERPIMS 4.0 DLH	Optional
29	COOLER	C10	Field Cooler ID	COOLER_ID	ERPIMS 4.0 DLH	Optional
30	ABLOT	C8 (DDMMYYNN)	Ambient Blank Lot ID	AB_LOT	ERPIMS 4.0 DLH	Conditional[11]
31	EBLOT	C8 (DDMMYYNN)	Equipment Blank Lot ID	EB_LOT	ERPIMS 4.0 DLH	Conditional[11]
32	TBLOT	C8 (DDMMYYNN)	Trip Blank Lot ID	TB_LOT	ERPIMS 4.0 DLH	Conditional[11]
33	PARUN	N12,4	Uncertainty	UNCERTAINTY	ERPIMS 4.0 DLH	Conditional[12]
34	PRECISION	N1	Primary Value Precision	PRECISION	ERPIMS 4.0 DLH	Not null

TABLE A-1: MWH ENHANCED ERPIMS 4.0 EDD FORMAT

MWH's standard database format requires a single delimited text file that meets the specifications and size constraints outlined below. * *A comma delimited file is required*, but an acceptable alternative may be used as long as it meets the same specifications and is O.K.ed prior to the first data submittal. ***It is required that all fields must be provided in the order listed below, regardless if the field is populated or left NULL.*** Any variations need to be discussed with the Project Database Manager.

Col	Field Name	Format	Description	Envision Field	Reference	Constraints
35	EXPECTED	N14,4	Expected Value (for spiked samples)	EXPECTED	ERPIMS 4.0 DLH	Conditional[13]
36	EVPREC	N1	Expected Value Precision	EV_PREC	ERPIMS 4.0 DLH	Conditional[14]
37	MDL	N14,4	Method Detection Limit	MDL	ERPIMS 4.0 DLH	Conditional[15]
38	RL	N14,4	Reporting Limit	REP_LIMIT	ERPIMS 4.0 DLH	Conditional[15]
39	LCHMETH	C7 (Valid Value List)	Leachate Method	LCH_CODE	ERPIMS 4.0 DLH	Not null
40	RUN_NUMBER	N2 (1-99)	Run Number	RUN_NO	ERPIMS 4.0 DLH	Not null
41	LCHDATE	D (DD-MMM-YYYY)	Leachate Date	LCH_DATE	ERPIMS 4.0 DLH	Conditional[16]
42	LCHTIME	C4 (HHMM)	Leachate Time	LCH_TIME	ERPIMS 4.0 DLH	Conditional[16]
43	LCHLOT	C10	Leachate Lot	LCH_LOT	ERPIMS 4.0 DLH	Conditional[16]
44	ANALOT	C10	Analytical Lot	ANAL_LOT	ERPIMS 4.0 DLH	Optional
45	PRCCODE	C3 (Valid Value List)	Analyte Type	CHEM_TYPE	ERPIMS 4.0 DLH	Not null
46	CALREFID	C10	Calibration Reference	CAL_REF_ID	ERPIMS 4.0 DLH	Optional
47	VQ_1C	C2 (Valid Value List)	First Column Value Qualifier	VQ_1C	ERPIMS 4.0 DLH	Optional
48	VAL_1C	N14,4	First Column Value	VAL_1C	ERPIMS 4.0 DLH	Optional
49	FCVALPREC	N1	First Column Precision	FCVAL_PREC	ERPIMS 4.0 DLH	Optional
50	VQ_CONFIRM	C2 (Valid Value List)	Confirming Column Value Qualifier	VQ_CONFIRM	ERPIMS 4.0 DLH	Optional
51	VAL_CONFIRM	N14,4	Confirming Column Value	VAL_CONFIRM	ERPIMS 4.0 DLH	Optional
52	CNFVALPREC	N1	Confirming Column Precision	CNFVAL_PREC	ERPIMS 4.0 DLH	Optional
53	DQTYPE	C2 (Valid Value List)	Type of Data Qualifier System	DQ_TYPE	ERPIMS 4.0 DLH	Optional
54	LABFLAGS	C2 (Valid Value List)	Laboratory Flags	LAB_FLAG	ERPIMS 4.0 DLH	Optional
55	**RCPTDATE**	D (DD-MMM-YYYY)	Date Sample Received in Lab	REC_DATE	NA	Not null
56	**COMPNAME** [4]	C50	Compound Name	COMPNAME	NA	Not null
57	**CASNUMBER**	C10	Chemical Abstract Service No.	CASNUMBER	NA	Optional
58	**SPIKEAMT**	N14,4	Concentration Spiked	STD_VAL	NA	Optional
59	**EPAFLAGS** [6]	C6	Validation Qualifiers	VALID_FLAG	NA	Do not populate
60	**LOWLIMIT**	N10,4	Minimum Precision Control Limit	LOW_LIMIT	NA	Optional
61	**HIGHLIMIT**	N10,4	Maximum Precision Control Limit	HIGH_LIMIT	NA	Optional
62	**RPD**	N10,4	Maximum RPD control limit	RPD	NA	Optional
63	RTTYPE	C5 (Valid Value List)	Type of Remediation Technology	RT_TYPE	ERPIMS 4.0 DLH	Optional

Notes:

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
(Page 3 of 8)

TABLE A-1: MWH ENHANCED ERPIMS 4.0 EDD FORMAT

MWH's standard database format requires a single delimited text file that meets the specifications and size constraints outlined below. * *A comma delimited file is required,* but an acceptable alternative may be used as long as it meets the same specifications and is O.K.ed prior to the first data submittal. ***It is required that all fields must be provided in the order listed below, regardless if the field is populated or left NULL.*** Any variations need to be discussed with the Project Database Manager.

Col	Field Name	Format	Description	Envision Field	Reference	Constraints

1) An empty "comma separated" column MUST be submitted for any null column as a place-holder.
2) The latest ERPIMS DLH (Data Loading Handbook) version MUST be used to obtain valid values for all "ERPIMS 4.0 DLH" columns.
3) Columns with a "not null" constraint CANNOT be submitted null (empty).
4) Columns with an "optional" constraint can be submitted either null (empty) or populated.
5) Columns with a "conditional" constraint can be submitted null (empty) ONLY if not applicable to data.
4) The standard "PARNAME" from the most current ERPIMS valid value list MUST be used for the "COMPNAME" column.
5) Data column names can vary from those shown above as long as equivalent data and a clear definition of columns is supplied.
6) The "EPAFLAGS" field is not populated by the laboratory.
7) All Montgomery Watson "enhanced" ERPIMS columns are bolded.

Conditional Constraints:
9) EXTDATE, EXTTIME and LABLOTCTL May be NULL only if EXMCODE = "NONE"
10) FLDSAMPID May be NULL only when LOCID = 'LABQC'
11) ABLOT, EBLOT and TBLOT Must be NULL when LOCID = LABQC or FIELDQC
12) PARUN must be NULL when PRCCODE is not RN
13) EXPECTED must not be NULL when SACODE <> "N"; When SACODE ="N", EXPECTED must be NULL for non-surrogate compounds (PRCCODE <>STD)
14) EVPREC must be NOT NULL when EXPECTED NOT NULL
15) MLD and RL must not be NULL when UNITS <> "PERCENT" or "NONE";
Must be NULL when PRCCODE = "MI,PM,BAC or STD, PARVQ = TI, or when UNITS=PERCENT OR NONE
16) LCHDATE, LCHTIME and LCHLOT may be NULL only if LCHMETH = "NONE"

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
(Page 4 of 8)

TABLE A-2: MISCELLANEOUS ERPIMS 4.0 CRITERIA

ERPIMS Field	Description	Comments
LABSAMPID	Laboratory Sample Identification	This field cannot be null. Each distinct field sample should have a distinct LABSAMPID.
LOCID	Location Name	This field cannot be null. For field samples, take directly from the COC. If LOCID is not provided on the COC, contact MWH for assistance. All lab QC records (SACODE "BS", "BD", and "LB") must have a LOCID of "LABQC". All field blank records (SACODE "AB", "EB", and "TB") must have a locid of "FIELDQC". All matrix QC records (SACODE "MS", "SD", and "LR") must have a LOCID equal to that of the associated field sample ("parent" or "normal" sample). See Appendix B, Section 1.1 and Section 1.2 of the ERPIMS Data Loading Handbook for more detailed information.
MATRIX	Sample Matrix Code	This field cannot be null. Entry must be consistent with the latest ERPIMS Valid Value List (VVL). For field samples, take directly from the COC. If MATRIX is not provided on the COC, contact MWH for assistance. Records with LOCID of "LABQC" or "FIELDQC" must have MATRIX "WQ", "SQ", or "AQ", as specified in the VVL. All matrix QC records (SACODE "MS", "SD", and "LR") must have a MATRIX equal to that of the associated field sample ("parent" or "normal" sample). See Appendix B, Section 1.1 and Section 1.2 of the ERPIMS Data Loading Handbook for more detailed information.
SBD/SED	Beginning Depth/ Ending Depth	These fields cannot be null. For field samples, take directly from the COC. If SBD/SED is not provided on the COC, contact MWH for assistance. Records with LOCID of "LABQC" or "FIELDQC" must have SBD and SED of "0". All matrix QC records (SACODE "MS", "SD", and "LR") must have a SBD/SED equal to that of the associated field sample ("parent" or "normal" sample). See Appendix B, Section 1.1 and Section 1.2 of the ERPIMS Data Loading Handbook for more detailed information.
LOGDATE/LOGTIME	Sample Date/Sample Time	These fields cannot be null. For field samples, take directly from the COC. If LOGDATE is not provided on the COC, contact MWH for assistance. For records with LOCID of "LABQC" populate the LOGDATE/LOGTIME fields with either EXTDATE/TIME or ANADATE/TIME (whichever is earlier). All matrix QC records (SACODE "MS", "SD", and "LR") must have a LOGDATE/TIME equal to that of the associated field sample ("parent" or "normal" sample).
SACODE/SAMPNO	Sample Type/ Sample Number	These fields cannot be null. Entry must be consistent with the latest ERPIMS VVL. For field samples, take directly from the COC. If SACODE and SAMPNO are not provided on the COC, contact MWH for assistance. It is extremely important that the SACODE and SAMPNO fields are populated correctly, as several other fields (e.g., LOCID, MATRIX) depend on this. Protocols for correct population of SACODE are described, in detail, in Appendix B, Section 1 of the ERPIMS Data Loading Handbook. Note that the SAMPNO for field samples and matrix QC will almost always be "1"; however, incremented SAMPNOs ("2", "3", etc.) are critical for identifying multiple LABQC batches and FIELDQC samples created on the same day.
ANMCODE	Analytical Method Code	This field cannot be null. Entry must be consistent with the latest ERPIMS VVL. Consistency is important, since there are several possibilities for coding certain identical methods (e.g., TPH methods).

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
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TABLE A-2: MISCELLANEOUS ERPIMS 4.0 CRITERIA

ERPIMS Field	Description	Comments
EXMCODE	Preparation Method	Entry must be consistent with the latest ERPIMS VVL. op This field cannot be null. If the analytical method does not have an associated extraction method, use "NONE" as the EXMCODE. If the extraction method is part of the analytical method, use "METHOD" as the exmcode. See Appendix B, Section 3.0 of the ERPIMS Data Loading Handbook for more information.
EXTDATE / EXTTIME	Preparation Date/ Preparation Time	These fields can be null only if EXMCODE is "NONE".
LABLOTCTL	Preparation Batch Identification	This field cannot be null. It is extremely important that LABLOTCTL is populated correctly for each record. All records for field samples, field QC samples, lab QC samples, and matrix QC samples that are associated with the same preparation batch must have the exact same LABLOTCTL. This must be unique from any other LABLOTCTL that exists for the same analytical method, even if there are multiple analytical batches created on the same day. If a preparation batch is spread out over multiple laboratory data packages or sample delivery groups (SDGs), the LABLOTCTL must be consistent between all applicable SDGs.
PARVAL	Parameter Value	This field cannot be null. This is the primary analytical result. "0" must be entered for analytes reported with a PARVQ of "ND".
UNITS	Units of measure	This field cannot be null. Entry must be consistent with the latest ERPIMS VVL. If reporting a result as a percent recovery, populate this field with "PERCENT". See Appendix B, Section 5.0 of the ERPIMS Data Loading Handbook for detailed information regarding this field, as well as how it relates to other fields such as SACODE.
PARVQ	Parameter Value Qualifier	This field cannot be null. There are basically three possible entries for this field: (1) "ND" should be used when the analyte is not detected. In this case PARVAL must be "0"; (2) "=" should be used for all results reported equal to or greater than the reporting limit (PARVAL >=RL), as well as all results reported as percent recoveries; (3) "TR" should be used for all results reported between the method detection limit and the reporting limit (PARVAL between MDL and RL).
BASIS	Basis of reported result	This field cannot be null. For soil or tissue results, use "D" for dry-weight or "W" for wet-weight. BASIS for water, air, LABQC, and gas samples is "X".
EXPECTED	Expected Value	This is the target result for a QC sample or surrogate spike. For records with SACODE of "N", an EXPECTED value is only required for surrogate compounds. For all records with an SACODE other than "N" this field cannot be null. For all blank samples (SACODE "LB", "TB", "EB", "AB"), EXPECTED should be "0". For SACODE "FD" (field duplicate) and "LR" (lab duplicate), EXPECTED should be the PARVAL in the associated normal (SACODE "N") sample (except for surrogate recoveries). For spiked samples (SACODEs "MS", "SD", "BS", "BD), EXPECTED should be presented in the same UNITS as PARVAL. If a value, rather than a percent is used for MS/MSD samples, EXPECTED must be the amount spiked (SPIKEAMT) plus the amount in the "parent" sample. See Appendix B, Section 1.1 and Section 1.2 of the ERPIMS Data Loading Handbook for more detailed information.

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
(Page 6 of 8)

TABLE A-2: MISCELLANEOUS ERPIMS 4.0 CRITERIA

ERPIMS Field	Description	Comments
MDL / RL	Method Detection Limit / Reporting Limit	Both of these fields must be adjusted for dilution. The RL field must be adjusted for percent moisture if the BASIS is "D". When results are reported in percent recovery (UNITS of "PERCENT"), both of these fields should always be left blank (null). However, these fields cannot be null for any other records.
RUN_NUMBER	Run Number	This field cannot be null. This field permits the numerical coding of multiple or repeat analyses of a sample by the same analytical method. RUN_NUMBER is a very important field if re-extraction and/or reanalysis is required for a particular sample. For example, a sample is re-analyzed for specific analytes, which exceeded calibration during the first run. Data from the first run are given a RUN_NUMBER of "1", and data from the second run are given a RUN_NUMBER of "2". Only analytes, which were reported for each run as being within calibration, are included with the associated RUN_NUMBER. These two "runs" could even potentially be associated with different preparation batches; and therefore, have different LABLOTCTLs associated with each.
VQ_1C, VAL_1C, FCVALPREC, VQ_CONFIRM, VAL_CONFIRM, CNFVALPREC	Documentation of second column/detector confirmation	These fields must be filled in when a second column or second detector confirmation is performed for applicable chromatography analyses. See the ERPIMS Data Loading Handbook for more detailed information.

TABLE A-3: ERPIMS EDD CHECKER INSTALLATION INSTRUCTIONS, VERSION 3.0

Status	Instructions
First time installation First time users of the ERPIMS EDD Checker should use the following instructions:	1. The user must have a 15" or 17" (recommended) monitor and video card that can display 1024 x 768 resolution. Microsoft Access 97 must be installed on your computer. The ERPIMS error checker application will not work under Access 2000. A 200 MHz Pentium processor (or faster) and 128 MB RAM are recommended. Set your display resolution to 1024 x 768 and make sure font size is set to "small fonts" 2. Create a folder on your local drive where you want to install the application 3. Copy the following two files, found in the ERPIMS folder on the CD, into the folder you created in step 2. ERPIMSModules.mde ERPIMSTables.mdb **After copying the above files to your computer, check the properties of both files and make sure the read-only property of each file is unchecked. The application will not work if you fail to do this step.** 4. Look in the Windows\System (Windows 9X) or Windows\System32 (Windows NT) folders on your computer for the file COMDLG32.OCX. If you find this file, proceed to Step 5. If you cannot find this file, copy the file COMDLG32.OCX found in the \Windows\System folder on the CD to the Windows\System folder on your computer's C drive. 5. Create a shortcut desktop icon for the file ERPIMSModule.mde found in your local drive and folder where the application resides. 6. You may now run the ERPIMS application by doubling clicking the ERPIMS shortcut desktop icon created in Step 5. Note: If you cannot perform an EDD upload operation, most likely the COMDLG32.OCX file is not registered. This is an Active X file that must be registered within Access 97. It allows the common dialogue window to open for selecting path and file name for importing EDDs. Registering the COMDLG32.OCX file Open the ERPIMS EDD checker application and perform the following steps. a. Click Tools on the MS Access Toolbar b. Click ActiveX controls c. Click Register d. Select COMDLG32.OCX in the C:\Windows\System folder e. Click Open f. Click Close g. Exit the ERPIMS application then open again. Please call Laboratory Data Consultants at (760) 634-0437 if you need further assistance in registering the .OCX file.

TABLE A

MWH ENHANCED ERPIMS EDD STRUCTURE AND INSTRUCTION
(Page 8 of 8)

TABLE A-3: ERPIMS EDD CHECKER INSTALLATION INSTRUCTIONS, VERSION 3.0

Status	Instructions
Upgrading the ERPIMS EDD Checker If a previous version of the ERPIMS EDD Checker has already been installed, the following instructions should be followed:	1. Open Windows Explorer and open the file folder where the current ERPIMS error checker resides. Remove the following files ERPIMSModules .mde ERPIMSTables.mdb You may instead rename these files (i.e., ERPIMSModules_old.mde) or move them into another file folder for archiving. 2. Copy the following files found in the ERPIMS folder on the CD into the folder opened in Step 1. ERPIMSModules.mde ERPIMSTables.mdb It is important to copy the ERPIMSTables.mdb file from the CD and not retain the original because changes have been made to the table structures in the updated beta version of the EDD checker. **NOTE: After copying, check the properties of both files and make sure the read-only property of each file is unchecked.** 3. You may now run the ERPIMS EDD checker by either double clicking the ERPIMSModules.mde file or the short-cut icon created for the original version.

The Electronic Deliverable Format™ (EDF)

Version 1.2i

The Laboratory Electronic Deliverable Format™ (LAB EDF)

GUIDELINES & RESTRICTIONS

Prepared by

ArsenaultLegg, Inc.
9600 Main Tree Drive
Anchorage, Alaska 99507
Phone: (907) 346-3827
Fax: (907) 346-1577
E-mail: edfhelp@enabl.com
Web site: www.enabl.com

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TABLE 1

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6020A (ICPMS)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO
(Page 1 of 4)

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
MS tuning sample	Prior to initial calibration, solution as specified in Section 7.10 of method (e.g., ^{7}Li, ^{59}Co, ^{115}In, and ^{205}Tl)	Mass calibration ≤ 0.1 amu from the true value. Resolution < 0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least three replicate analysis.	Retune instrument then reanalyzing tuning solution.	Per Section II of ICP-MS NFG, except substitute with method acceptance limits.	RSD > 5% = J/UJ (professional judgment on criteria related to non-target analytes).
Initial calibration (ICAL) for all target analytes (minimum one standard and a blank)	Daily initial calibration prior to sample analysis	If more that one standard is used, correlation coefficient (r^2) ≥ 0.995	Correct problem then repeat initial calibration.	Per Section III of ICP-MS NFG.	r^2 < 0.995 = J/UJ
Initial Calibration Verification (ICV)	After ICAL, before beginning a sample run (at a concentration other than used for calibration and from a second source)	All analytes within ±10% of expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Per Section III of ICP-MS NFG.	%R < 90 or >110% = J/UJ
Initial Calibration Blank (ICB)	After ICV	No analyte detected ≥ 2X MDL	Correct problem and reanalyze.	Per Section IV of ICPMS NFG, except U at detected value if result > MDL < RL.	Per Table 14 in NFG, except U at detected value if result > MDL < RL.
Low-Level Calibration	Daily, after ICAL (at a concentration	The analyte(s) within ±30% of expected value.	Correct problem then reanalyze.	Per Section III of ICP-MS NFG.	%R < 70% or > 130% (%R < 50% or > 150%

TABLE 1

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6020A (ICPMS)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Check Standard (LLCCS)	≤ RLs).				for Co, Mn, or Zn) = J/UJ
Interference Check Solution A & AB (ICS-A & ICS-AB)	At the beginning of an analytical run or once during a 12-hour period, whichever is more frequent	ICS-A: All non-spiked analytes < 2X MDL. ICS-AB: Within ± 20% of expected value.	Correct problem and reanalyze ICS-A and ICS-AB.	Per Section III of ICP-MS NFG.	ICS < 80% or > 120% = J/UJ
Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the analysis sequence (at a mid-calibration range concentration)	The analyte within ±10% of expected value	Correct problem then repeat CCV and reanalyze all samples since last successful CCV.	Per Section III of ICP-MS NFG.	CCV < 90 or > 110% = J/UJ
Continuing Calibration Blank (CCB)	Before beginning a sample run, after every 10 samples, and at end of the analytical sequence	No analyte detected ≥ 2X MDL	Correct problem then reanalyze calibration blank and previous 10 samples. Apply "B" flag to all associated positive results for the specific analyte(s) as appropriate.	Per Section IV of ICPMS NFG, except U at detected value if result > MDL < RL.	Per Table 14 in NFG, except U at detected value if result > MDL < RL.
Method blank (or preparation blank)	One per analytical batch	No analyte detected ≥ RL	Assess data. Correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank. Apply B-flag to all associated positive results for the specific analyte(s) in the	Per Section IV of ICPMS NFG, except U at detected value if result > MDL < RL.	Per Table 14 in NFG, except U at detected value if result > MDL < RL.

TABLE 1

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6020A (ICPMS)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO
(Page 3 of 4)

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
			preparation batch.		
LCS for all analytes	One LCS per analytical batch	Vendor-specified or laboratory-determined control limits (but not wider than 80-120% recovery). If LCS/LSC duplicate (LCSD) used, then use RPD ≤ 20.	Correct problem then reanalyze. If still out, re-prepare and reanalyze the LCS and all samples in the preparation batch.	Per Section VI of ICP-MS NFG, except substitute 80-120% recovery and ≤ 20 RPD limits.	%R < 80 or > 120% for water = J/UJ; < 50% = J detects, R non-detects
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One MS/MSD per every 20 samples per matrix	Laboratory-determined control limits (but not wider than 75-125% recovery and RPD ≤ 20).	Flag associated sample results and perform post-digestion spike addition.	Per Section VIII of ICP-MS NFG, except substitute 75-125% recovery and ≤ 20 RPD limits.	%R < 75 or > 125% for water = J/UJ; < 30% = J detects, R non-detects. Water RPD <20%, soil < 35%. Low level (< 5 X RL, use ± RL water, 2 X RL for soil). For MS, if %R < 30% and post spike< 75% or not run, J detects, R non-detects. If post spike > 75 %, UJ non-detects.
Post-digestion spike addition	If MS/MSD fails	Recovery within 75-125% of expected results.	Perform dilution test.	Not applicable	None; see dilution test.
Serial dilution (SD) test	One SD sample per every 20 samples (required for samples containing concentrations > 50 X MDL)	Fivefold (1+4) dilution must agree within ±10% of the original determination.	Flag associated sample results and discuss in case narrative.	Per Section IX of ICP-MS NFG.	%D < 90 > 110% = J/UJ

TABLE 1

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6020A (ICPMS)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Internal Standards (ISs)	Every sample; internal standards selected from list specified in Section 1.4 of method.	IS intensity ≥ 70% < 130% of intensity of the IS in the ICAL.	Perform corrective action as described in Section 9.6 of method.	Per Section X of ICP-MS NFG, except substitute 70-130 % limits.	IS %R < 70% > 130 % = J/UJ
Concentrations between the MDL and RL	All samples	Not applicable	Flag as estimated value ("J" flag)	Not applicable	Not applicable

[a] National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004).
[b] Refer to NFG for detailed evaluation protocols.

MDL – method detection limit
RL – reporting limit

TABLE 2

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6010B/C (ICP)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Initial calibration (ICAL) for all target analytes (minimum one standard and a blank)	Daily initial calibration prior to sample analysis	If more that one standard is used, correlation coefficient (r^2) $\geq$ 0.995	Correct problem then repeat initial calibration.	Per Section II of ICP NFG.	r^2 < 0.995 = J/UJ
Initial Calibration Verification (ICV)	After ICAL, before beginning a sample run (at a concentration other than used for calibration and from a second source)	All analytes within ±10% of expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Per Section II of ICP NFG.	%R < 90 or >110% = J/UJ
Initial Calibration Blank (ICB)	After ICV	No analyte detected $\geq$ 2X MDL	Correct problem and reanalyze.	Per Section III of ICP NFG, except U at detected value if result > MDL < RL.	Per Table 4 in NFG, except U at detected value if result > MDL < RL.
Low-Level Calibration Check Standard (LLCCS)	Daily, after ICAL (at a concentration ≤ RLs).	The analyte(s) within ±30% of expected value.	Correct problem then reanalyze.	Per Section II of ICP NFG.	%R < 70% or > 130% (%R < 50% or > 150% for Sb, Pb, Tl) = J/UJ
Interference Check Solution A & AB (ICS-A & ICS-AB)	At the beginning of an analytical run	ICS-A: All non-spiked analytes < 2X MDL. ICS-AB: Within ± 20% of expected value.	Correct problem and reanalyze ICS-A and ICS-AB.	Per Section IV of ICP NFG.	ICS < 80% or > 120% = J/UJ

TABLE 2

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6010B/C (ICP)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the analysis sequence (at a mid-calibration range concentration)	The analyte within ±10% of expected value	Correct problem then repeat CCV and reanalyze all samples since last successful CCV.	Per Section II of ICP NFG.	CCV < 90 or > 110% = J/UJ
Continuing Calibration Blank (CCB)	Before beginning a sample run, after every 10 samples, and at end of the analytical sequence	No analyte detected ≥ 2X MDL	Correct problem then reanalyze calibration blank and previous 10 samples. Apply "B" flag to all associated positive results for the specific analyte(s) as appropriate.	Per Section III of ICP NFG, except U at detected value if result > MDL < RL.	Per Table 4 in NFG, except U at detected value if result > MDL < RL.
Method blank (or preparation blank)	One per analytical batch	No analyte detected ≥ RL	Assess data. Correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank. Apply B-flag to all associated positive results for the specific analyte(s) in the preparation batch.	Per Section III of ICP NFG, except U at detected value if result > MDL < RL.	Per Table 4 in NFG, except U at detected value if result > MDL < RL.
LCS for all analytes	One LCS per analytical batch	Vendor-specified or laboratory-determined control limits (but not wider than 80-120% recovery). If LCS/LSC duplicate (LCSD) used, then use RPD ≤ 20.	Correct problem then reanalyze. If still out, re-prepare and reanalyze the LCS and all samples in the preparation batch.	Per Section V of ICP NFG, except substitute 80-120% recovery and ≤ 20 RPD limits.	%R < 80 or > 120% for water = J/UJ; < 50% = J detects, R non-detects

TABLE 2

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 6010B/C (ICP)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One MS/MSD per every 20 samples per matrix	Laboratory-determined control limits (but not wider than 75-125% recovery and RPD ≤ 20).	Flag associated sample results and perform post-digestion spike addition.	Per Section VII of ICP NFG, except substitute 75-125% recovery and ≤ 20 RPD limits.	%R < 75 or > 125% for water = J/UJ; < 30% = J detects, R non-detects. Water RPD <20%, soil < 35%. Low level (< 5 X RL, use ± RL water, 2 X RL for soil). For MS, if %R < 30% and post spike< 75% or not run, J detects, R non-detects. If post spike > 75 %, UJ non-detects.
Post-digestion spike addition	If MS/MSD fails	Recovery within 75-125% of expected results.	Perform dilution test.	Not applicable	None; see dilution test.
Serial dilution (SD) test	One SD sample per every 20 samples (required for samples containing concentrations > 50 X MDL)	Fivefold (1+4) dilution must agree within ±10% of the original determination.	Flag associated sample results and discuss in case narrative.	Per Section VIII of ICP NFG.	%D < 90 > 110% = J/UJ
Concentrations between the MDL and RL	All samples	Not applicable	Flag as estimated value ("J" flag)	Not applicable	Not applicable

[a] National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004).
[b] Refer to NFG for detailed evaluation protocols.

MDL – method detection limit
RL – reporting limit

TABLE 3

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 7470A/7471A (CVAA)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
Initial calibration (ICAL) for all target analytes (minimum one standard and a blank)	Daily initial calibration prior to sample analysis	Blank plus five calibration concentrations, correlation coefficient (r^2) $\geq$ 0.995	Correct problem then repeat initial calibration.	Per Section II of AA NFG.	r^2 < 0.995 = J/UJ
Initial Calibration Verification (ICV)	After ICAL, before beginning a sample run (at a concentration other than used for calibration and from a second source)	All analytes within $\pm$10% of expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Per Section II of AA NFG.	%R < 80 or >120% = J/UJ
Initial Calibration Blank (ICB)	After ICV	No analyte detected $\geq$ 2X MDL	Correct problem and reanalyze.	Per Section III of AA NFG, except U at detected value if result > MDL < RL.	Per Table 24 in NFG, except U at detected value if result > MDL < RL.
Low-Level Calibration Check Standard (LLCCS)	Daily, after ICAL (at a concentration ≤ RLs).	The analyte(s) within $\pm$30% of expected value.	Correct problem then reanalyze.	Per Section II of AA NFG.	%R < 70% or > 130% = J/UJ
Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the analysis sequence (at a mid-calibration range	The analyte within $\pm$10% of expected value	Correct problem then repeat CCV and reanalyze all samples since last successful CCV.	Per Section II of AA NFG.	CCV < 80 or > 120% = J/UJ

TABLE 3

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 7470A/7471A (CVAA)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
	concentration)				
Continuing Calibration Blank (CCB)	Before beginning a sample run, after every 10 samples, and at end of the analytical sequence	No analyte detected ≥ 2X MDL	Correct problem then reanalyze calibration blank and previous 10 samples. Apply "B" flag to all associated positive results for the specific analyte(s) as appropriate.	Per Section III of AA NFG, except U at detected value if result > MDL < RL.	Per Table 24 in NFG, except U at detected value if result > MDL < RL.
Method blank (or preparation blank)	One per analytical batch	No analyte detected ≥ RL	Assess data. Correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank. Apply B-flag to all associated positive results for the specific analyte(s) in the preparation batch.	Per Section III of AA NFG, except U at detected value if result > MDL < RL.	Per Table 24 in NFG, except U at detected value if result > MDL < RL.
LCS for all analytes	One LCS per analytical batch	Vendor-specified or laboratory-determined control limits (but not wider than 80-120% recovery). If LCS/LSC duplicate (LCSD) used, then use RPD ≤ 20.	Correct problem then reanalyze. If still out, re-prepare and reanalyze the LCS and all samples in the preparation batch.	Per Section IV of AA NFG, except substitute 80-120% recovery and ≤ 20 RPD limits.	%R < 80 or > 120% for water = J/UJ; < 50% = J detects, R non-detects
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One MS/MSD per every 20 samples per matrix	Laboratory-determined control limits (but not wider than 75-125% recovery and RPD ≤ 20).	Flag associated sample results and perform post-digestion spike addition.	Per Section VI of AA NFG, except substitute 75-125% recovery and ≤ 20 RPD	%R < 75 or > 125% for water = J/UJ; < 30% = J detects, R non-detects. Water RPD <20%, soil < 35%. Low level (< 5 X

TABLE 3

SUMMARY OF CALIBRATION AND QC PROCEDURES FOR EPA METHOD 7470A/7471A (CVAA)
SOUTHEAST IDAHO MINE SITES, P4 MONSANTO

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action/Lab Flagging Criteria	Data Validation Reference Section [a]	Data Validation Qualification [b]
				limits.	RL, use ± RL water, 2 X RL for soil). For MS, if %R < 30% and post spike< 75% or not run, J detects, R non-detects. If post spike > 75 %, UJ non-detects.
Concentrations between the MDL and RL	All samples	Not applicable	Flag as estimated value ("J" flag)	Not applicable	Not applicable

[a] National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004).
[b] Refer to NFG for detailed evaluation protocols.

MDL – method detection limit
RL – reporting limit

ATTACHMENT C

Summary of Calibration and QC Procedures for Historical Laboratory Analysis

TABLE 1

EPA METHOD 6020 (ICPMS/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Tune	ICPMS Tune Standard (^{7}Li, ^{59}Co, ^{115}In, and ^{205}Tl); each analytical batch	Mass calibration and resolution checks for both low and high mass isotopes and are within 0.1 amu of the true value. Resolution < 0.9 amu full width at 10% peak height. RSDs of isotopes (^{7}Li, ^{59}Co, ^{115}In, and ^{205}Tl) < 5%	Retune if criteria not met.	Per Section II of ICP-MS NFG, except substitute with method acceptance limits.
		ISTD soln added on line to all samples, calibrations, and QC			
2	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in initial calibration)	Correlation coefficent ≥ 0.995; (PQL not evaluated for 6020 per method)	Recalibrate if criteria not met.	Per Section III of ICP-MS NFG.
3	PQL Std	IC: Low-level calibration standard			
4	Level 3 Std	IC: Level 3 concentration			
5	Level 4 Std	IC: Level 4 concentration			
6	Level 5 Std	IC: Level 5 concentration			
7	WG_ICV	Initial calibration verification (once after IC)	Recovery 90-110%. Must be from different source than cal stock.	Rerun; if criteria are not met, recalibrate.	Per Section III of ICP-MS NFG.
8	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
NA	WG_PQV	PQV - A low-level spike sample; not analyzed by ACZ (see note in acceptance criteria).	Note: A low level spike is not required by Method 6020 and was not performed by ACZ.	NA	NA
9	WG_ICSA	Interference Check Sample A (beginning of the analytical run sequence or once every 12 hours)	Table 1 of 6020; Interferent check only, recoveries not calculated by ACZ.	NA	NA

TABLE 1

EPA METHOD 6020 (ICPMS/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
10	WG_ICSAB	Interference Check Sample AB (beginning of the analytical run sequence or once every 12 hours)	Table 1 of 6020; Recovery 80-120%	Flag associated samples.	Per Section V of ICP-MS NFG.
11	PrepBatchPBS	Laboratory method blank (MB)	Concentrations < 3x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
12	PrepBatchLCSS	Laboratory control sample (LCS)	Within laboratory or vendor specified recovery control limits as listed on ACZ report; RPD < 20	Flag associated samples.	Per Section VI of ICP-MS NFG, except substitute 80-120% recoveries and < 20 RPD.
13	PrepBatchLCSSD	Laboratory control sample duplicate (LCSD)			
14	WG_Sample 1	(Internal Standards [ISs] added in line by peristaltic pump.)	IS Recoveries 70-130% of those in the ICB.	Rerun	IS: Per Section X of ICP-MS NFG, except substitute 70-130%
15	WG_Sample 2				
16	WG_Sample 3				
17	WG_Sample 3SDL	Dilution Test (1:5)	%D < 10% (for those analytes > 50 X MDL).	Flag associated samples.	Per Section IX of ICP-MS NFG.
18	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section III of ICP-MS NFG.
19	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
20	WG_Sample 4				

TABLE 1

EPA METHOD 6020 (ICPMS/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
21	WG_Sample 4MS	Matrix spike	Recovery of target compounds 75-125%, and RPD < 20.	Flag associated samples.	Per Section VIII of ICP-MS NFG, except substitute 75-125% recoveries and < 20 RPD.
22	WG_Sample 4MSD	Matrix spike duplicate			
23	WG_Sample 5				
24	WG_Sample 6				
25	WG_Sample 7				
26	WG_Sample 8				
27	WG_Sample 9				
28	WG_Sample 10				
29	WG_Sample 11				
30	WG_CCV2	Continuing calibration verification (after every 10 runs)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section III of ICP-MS NFG.
31	WG_CCB2	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL		Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
32	WG_Sample 12				
33	WG_Sample 13				
34	WG_CCV3	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section III of ICP-MS NFG.
35	WG_CCB3	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.

TABLE 1

EPA METHOD 6020 (ICPMS/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]

ISTD - internal standard solution
PBS - preparation blank sample
PDS - post-digestion spike
PQL - Practical quantitation limit (equivalent to RL or CRDL)
PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature)
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

TABLE 2

EPA METHOD 200.8 (ICPMS/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 1 of 4)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Tune	ICPMS Tune Standard (^{9}Be, ^{24}Mg, ^{59}Co, ^{115}In, and ^{208}Pb); each analytical batch	Mass calibration and resolution checks for both low and high mass isotopes and are within 0.1 amu of the true value. Resolution < 0.9 amu full width at 10% peak height. RSDs of isotopes (^{9}Be, ^{24}Mg, ^{59}Co, ^{115}In, and ^{208}Pb) < 5%.	Retune if criteria not met.	Per Section II of ICP-MS NFG, except substitute with method acceptance limits.
		ISTD soln added on line to all samples, calibrations, and QC			
2	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in initial calibration)	Correlation coefficient ≥ 0.995; recoveries for PQL not calculated or evaluated.	Recalibrate if criteria not met.	Per Section III of ICP-MS NFG.
3	PQL Std	IC: Low-level calibration standard			
4	Level 3 Std	IC: Level 3 concentration			
5	Level 4 Std	IC: Level 4 concentration			
6	Level 5 Std	IC: Level 5 concentration			
7	WG_ICV	Initial calibration verification (once after IC)	Recovery 90-110%	Rerun; if criteria are not met, recalibrate.	Per Section III of ICP-MS NFG.
8	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.

TABLE 2

EPA METHOD 200.8 (ICPMS/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
NA	WG_PQV	PQV - A low-level spike sample; not analyzed by ACZ (see note in acceptance criteria).	Note: A low level spike is not required by Method 200.8 and was not performed by ACZ.	NA	NA
NA	WG_SDL	Serial dilution	Note: Serial dilution is not required by Method 200.8 and was not performed by ACZ.	NA	NA
9	PrepBatch_LRB	Laboratory reagent blank (LRB)	Concentrations < 2x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
10	PrepBatch_LFB	Laboratory fortified blank (LFB)	Recovery 85-115%	Flag associated samples.	Per Section VI of ICP-MS NFG, except substitute with 85-115% limits.
11	WG_Sample 1	(Internal standards [ISs] added in line by peristaltic pump.)	IS Recoveries 60-125% of those in the ICB.	Rerun	IS: Per Section X of ICP-MS NFG, except substitute with 60-125% limits
12	WG_Sample 2				
13	WG_Sample 2AS or WG_Sample2LFM	Analytical spike (post digestion) or laboratory fortified matrix	AS/ASD: Recoveries 70-130%; RPD < 20 or LFM/LFMD: 70-130%; RPD < 20	Flag associated samples.	Per Section VIII of ICP-MS NFG, except substitute 75-125% recoveries and < 20 RPD limits.
14	WG_Sample 2ASD or WG_Sample2LFMD	Analytical spike duplicate (post digestion) or laboratory fortified matrix duplicate			
15	WG_Sample 3				
16	WG_Sample 4				
17	WG_Sample 5				
18	WG_Sample 6				

TABLE 2

EPA METHOD 200.8 (ICPMS/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 3 of 4)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
19	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section III of ICP-MS NFG.
20	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.
21	WG_Sample 7				
22	WG_Sample 8				
23	WG_Sample 9				
24	WG_Sample 10				
25	WG_Sample 11				
26	WG_Sample 12				
27	WG_Sample 13				
28	WG_Sample 14				
29	WG_Sample 15				
30	WG_Sample 16				
31	WG_CCV2	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section III of ICP-MS NFG.
32	WG_CCB2	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section IV and Table 14 of ICP-MS NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.

ISTD - internal standard solution
AS - Analytical spike (post-digestion spike)
ASD - analytical spike duplicate (post digestion spike)

TABLE 2

EPA METHOD 200.8 (ICPMS/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]

LFM - laboratory fortified matrix
LFMD - laboratory fortified matrix duplicate
PQL - Practical quantitation limit (equivalent to RL or CRDL)
PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature); not applicable to filtered metals
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

TABLE 3

EPA METHOD 6010 (ICP/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 1 of 3)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in initial calibration)	Correlation coefficent ≥ 0.995	Recalibrate if criteria not met.	Per Section II of ICP NFG.
2	PQL Std	IC: Low-level calibration standard			
3	Level 3 Std	IC: Level 3 concentration			
4	Level 4 Std	IC: Level 4 concentration			
5	Level 5 Std	IC: Level 5 concentration			
6	WG_ICV	Initial calibration verification (once after IC)	Recovery 90-110%. Must be from different source than cal stock.	Rerun; if criteria are not met, recalibrate.	Per Section II of ICP NFG.
7	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.
8	PQV	Low-level spike (once after IC)	Recovery 70-130%	Flag associated samples.	Per Section II of ICP NFG.
9	WG_ICSA	Interference Check Sample A (beginning of the analytical run sequence or once every 12 hours)	Interferent check only, recoveries not calculated by ACZ.	NA	NA
10	WG_ICSAB	Interference Check Sample AB (beginning of the analytical run sequence or once every 12 hours)	Recovery 80-120%	Flag associated samples.	Per Section IV of ICP NFG.
11	WG_Sample 1				
12	WG_Sample 1SDL	Dilution Test (1:5)	%D < 10% (for those analytes > 50 X MDL).	Flag associated samples.	Per Section VIII of ICP NFG.
13	PrepBatchPBS	Laboratory method blank (MB)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.
14	WG_Sample 2				

TABLE 3

EPA METHOD 6010 (ICP/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
15	Sample2AS	Analytical spike (post digestion)	Recoveries 75-125%; RPD < 20.	Flag associated samples.	Per Section VII of ICP NFG, except substitute 75-125% recovery and RPD < 20 limits.
16	Sample2ASD	Analytical spike duplicate (post digestion)			
17	WG_Sample 3				
18	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section II of ICP NFG.
19	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.
20	WG_Sample 4				
21	WG_Sample 4DUP	Laboratory duplicate (DUP)	RPD < 20	Flag associated samples.	Per Section VI of ICP NFG.
22	WG_Sample 4				
23	WG_Sample 5				
24	WG_Sample 6				
25	WG_Sample 7				
26	WG_Sample 8				
27	WG_Sample 9				
28	WG_Sample 10				
29	WG_Sample 11				
30	WG_CCV2	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%.	If fails, rerun samples run since last passing CCV.	Per Section II of ICP NFG.
31	WG_CCB2	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.

TABLE 3

EPA METHOD 6010 (ICP/SOIL and TISSUE) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]

AS - Analytical spike (post-digestion spike)
ASD - analytical spike duplicate (post digestion spike)
PBS - preparation blank sample
PDS - post-digestion spike
PQL - Practical quantitation limit (equivalent to RL or CRDL)
PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature)
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

TABLE 4

EPA METHOD 200.7 (ICP/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in initial calibration)	Depending on instrument (date manufactured), either one-point calibration or multi (three)-point calibration with correlation coefficient ≥ 0.995		Per Section II of ICP NFG.
2	Calibration	One-point or multipoint calibration			
3	WG_ICV	Initial calibration verification (once after IC)	Recovery 95-105%	Rerun; if criteria are not met, recalibrate.	Per Section II of ICP NFG (90-110%).
4	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.
5	WG_PQV	Low-level spike	PQV Recovery 70-130%	Flag associated samples.	Per Section II of ICP NFG.
NA	WG_SDL	Serial dilution	Note: Serial dilution is not required by Method 200.7 and was not performed by ACZ.	NA	NA
6	WG_SIC	Spectral interference check (SIC)	SIC Recovery 80-120%	Flag associated samples.	Per Section IV of ICP NFG.
7	PrepBatch_LFB	Laboratory fortified blank (LFB)	Recovery 85-115%	Flag associated samples.	Per Section V of ICP NFG, except substitute 85-115% limits.
8	WG_Sample 1				
9	WG_Sample 2				

TABLE 4

EPA METHOD 200.7 (ICP/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
10	WG_Sample 2AS or WG_Sample2LFM	Analytical spike (post digestion) or laboratory fortified matrix	AS/ASD: Recoveries 85-115%; PRD < 20 or LFM/LFMD: 70-130%; RPD < 20	Flag associated samples.	Per Section VII of ICP NFG, except substitute 75-125% recoveries and < 20 RPD limits.
11	WG_Sample 2ASD or WG_Sample2LFMD	Analytical spike duplicate (post digestion) or laboratory fortified matrix duplicate			
12	WG_Sample 3				
13	WG_Sample 4				
14	WG_Sample 5				
15	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of ICP NFG (90-110%).
16	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.
17	WG_Sample 6				
18	WG_Sample 7				
19	WG_Sample 8				
20	WG_Sample 9				
21	WG_Sample 10				
22	WG_Sample 11				
23	WG_Sample 12				
24	WG_Sample 13				
25	WG_Sample 14				
26	WG_Sample 15				
27	WG_CCV2	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of ICP NFG (90-110%).

TABLE 4

EPA METHOD 200.7 (ICP/WATER) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
28	WG_CCB2	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 4 of ICP NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.

AS - Analytical spike (post-digestion spike)
ASD - analytical spike duplicate (post digestion spike)
LFM - laboratory fortified matrix
LFMD - laboratory fortified matrix duplicate
MDL - method detection limit
PQL - Practical quantitation limit (equivalent to RL or CRDL)
PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature); not applicable to filtered metals
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

TABLE 5

STANDARD METHODS 3114B (Selenium AA-Hydride) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 1 of 3)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in	Correlation coefficient ≥ 0.995		Per Section II of AA NFG.
2	Level 1 Std	IC: Level 1 concentration			
3	Level 2 Std	IC: Level 2 concentration			
4	Level 3 Std	IC: Level 3 concentration			
5	Level 4 Std	IC: Level 4 concentration			
6	Level 5 Std	IC: Level 5 concentration			
7	WG_ICV	Initial calibration verification (once after IC)	Recovery 90-110%	Rerun; if criteria are not met, recalibrate.	Per Section II of AA NFG, except use 80-120% recovery limits.
8	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
9	PrepBatch_LRB	Laboratory reagent blank (LRB)	Concentrations < 2x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
10	PrepBatch_LFB	Laboratory fortified blank (LFB)	Recovery 85-115%	Flag associated samples.	Per Section IV of AA NFG, except use 80-120% recovery limits.
11	WG_Sample 1				
12	WG_Sample 2				
13	WG_Sample 2LFM	Laboratory fortified matrix (LFM) spike	Recovery 85-115%; RPD < 20	Flag associated samples.	Per Section VI of AA NFG, except use 75-125% recovery limits.
14	WG_Sample 2LFMD	Laboratory fortified matrix duplicate (LFMD) spike			

TABLE 5

STANDARD METHODS 3114B (Selenium AA-Hydride) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 2 of 3)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
15	WG_Sample 3				
16	WG_Sample 4				
17	WG_Sample 5				
18	WG_Sample 6				
19	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of AA NFG, except use 80-120% recovery limits.
20	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
21	WG_Sample 7				
22	WG_Sample 8				
23	WG_Sample 9				
24	WG_Sample 10				
25	WG_Sample 11				
26	WG_Sample 12				
27	WG_Sample 13				
28	WG_Sample 14				
29	WG_Sample 15				
30	WG_Sample 16				
31	WG_CCV2	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of AA NFG, except use 80-120% recovery limits.
32	WG_CCB2	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.
MDL - method detection limit
PQL - Practical quantitation limit (equivalent to RL or CRDL)

TABLE 5

STANDARD METHODS 3114B (Selenium AA-Hydride) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]

PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature); not applicable to filtered metals
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

TABLE 6

EPA METHOD 245.1 (Mercury CVAA) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
1	Cal Blank	Initial Calibration (IC) (once at the beginning of the analytical sequence): Calibration blank (lowest point in initial calibration)	Correlation coefficient ≥ 0.995		Per Section II of AA NFG.
2	Level 1 Std	IC: Level 1 concentration			
3	Level 2 Std	IC: Level 2 concentration			
4	Level 3 Std	IC: Level 3 concentration			
5	Level 4 Std	IC: Level 4 concentration			
6	WG_ICV	Initial calibration verification (once after IC)	Recovery 90-110%	Rerun; if criteria are not met, recalibrate.	Per Section II of AA NFG, except use 80-120% recovery limits.
7	WG_ICB	Initial calibration blank (once after IC)	Concentrations < 3x MDL	Rerun; if criteria are not met, evaluate instrument system; perform instrument maintenance and recalibrate.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
8	PrepBatch_LRB	Laboratory reagent blank (LRB)	Concentrations < 2x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
9	PrepBatch_LFB	Laboratory fortified blank (LFB)	Recovery 85-115%	Flag associated samples.	Per Section IV of AA NFG, except use 80-120% recovery limits.
10	WG_Sample 1				
11	WG_Sample 2				

TABLE 6

EPA METHOD 245.1 (Mercury CVAA) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
12	WG_Sample 2LFM	Laboratory fortified matrix (LFM) spike	Recovery 85-115%; PRD < 20	Flag associated samples.	Per Section VI of AA NFG, except use 75-125% recovery limits.
13	WG_Sample 2LFMD	Laboratory fortified matrix duplicate (LFMD) spike			
14	WG_Sample 3				
15	WG_Sample 4				
16	WG_Sample 5				
17	WG_Sample 6				
18	WG_CCV1	Continuing calibration verification (after every 10 runs)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of AA NFG, except use 80-120% recovery limits.
19	WG_CCB1	Continuing calibration blank (after each CCV)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.
20	WG_Sample 7				
21	WG_Sample 8				
22	WG_Sample 9				
23	WG_Sample 10				
24	WG_Sample 11				
25	WG_Sample 12				
26	WG_Sample 13				
27	WG_Sample 14				
28	WG_Sample 15				
29	WG_Sample 16				
30	WG_CCV2	Continuing calibration verification (last CCV, run at end of analytical sequence)	Recovery 90-110%. If fails, rerun samples run since last passing CCV.	If fails, rerun samples run since last passing CCV.	Per Section II of AA NFG, except use 80-120% recovery limits.

TABLE 6

EPA METHOD 245.1 (Mercury CVAA) - HISTORICAL ACZ PROCEDURES
P4 SOUTHEAST IDAHO MINE SITES
(Page 3 of 3)

Item No.	QC Element and Sequence	Description and Frequency	Acceptance Criteria	Corrective Action	Data Validation Reference [a]
31	WG_CCB2	Continuing calibration blank (last CCB, run at end of analytical sequence)	Concentrations < 3x MDL	Flag associated samples.	Per Section III and Table 24 of AA NFG, except U at detected value if result > MDL < RL.

[a] Refer to National Functional Guidelines (NFG) for Inorganic Data Review (USEPA, 2004) for detailed evaluation protocol.

MDL - method detection limit
PQL - Practical quantitation limit (equivalent to RL or CRDL)
PrepBatch - Preparation Batch (ACZ's preparation or digestate batch nomenclature); not applicable to filtered metals
RPD - relative percent difference
WG - Work Group (ACZ's sequential analytical batch nomenclature)

ATTACHMENT D

Data Validation Report Templates for Historical Data

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 25, 2008

Matrix: Water

Parameters: Metals by ICP EPA Method 200.7

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05
TSB-GJ-08-10MSD	5/12/08	44433-06

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 200.7: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following “Reason Codes” will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) standard frequency and limits (70-130%) were met. Limit for antimony, lead, and thallium are 50-150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium Mercury	1.3 ug/L 1.1 ug/L 1.4 ug/L 2.7 ug/L 8.0 ug/L 0.1 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/L 0.70 ug/L	0.40U ug/L 0.70U ug/L
TSB-GJ-08-30	Lithium	10.0 ug/L	10.0U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results are not addressed in this report, but will be assessed as part of a separate data usability assessment.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits, results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

The serial dilution sample is not specified in Method 200.8 and it has not been a required QC item for historic data. The impact of not reporting the serial dilution sample pair is usually that potentially high matrix interferences would not be monitored and potentially high-biased data would not be identified. There can be low biases, but they are not found in the majority of outliers. This would apply only to samples that have analytes reported at greater than 50 x the MDL. Analytes reported below 50 x MDL would not be qualified per the validation guidance.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2 ug/L	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40 ug/L 0.70 ug/L	A
44433	TSB-GJ-08-30	Lithium	10.0 ug/L	A

Report# ########

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 25, 2008

Matrix: Soil

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05
TSB-GJ-08-10MSD	5/12/08	44433-06

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium Mercury	1.3 ug/Kg 1.1 ug/Kg 1.4 ug/Kg 2.7 ug/Kg 8.0 ug/Kg 0.1 ug/Kg	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/Kg	0.2U ug/Kg
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/Kg 0.70 ug/Kg	0.40U ug/Kg 0.70U ug/Kg
TSB-GJ-08-30	Lithium	10.0 ug/Kg	10.0U ug/Kg

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results are not addressed in this report, but will be assessed as part of a separate data usability assessment.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits; results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm$10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Sodium and Uranium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the RLs.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/Kg	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40U ug/Kg 0.70U ug/Kg	A
44433	TSB-GJ-08-30	Lithium	10.0U ug/Kg	A

Report# #######

Laboratory Data Consultants
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 25, 2008

Matrix: Water

Parameters: Metals by ICPMS USEPA Method 200.8

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories, Inc.

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05
TSB-GJ-08-10MSD	5/12/08	44433-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 200.8 ICPMS: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

Method 200.8 does not specify analysis of a low-level calibration standard, and it has not been a required QC item for historic data.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium	1.3 ug/L 1.1 ug/L 1.4 ug/L 2.7 ug/L	All samples in SDG 44433

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
	Lithium Mercury	8.0 ug/L 0.1 ug/L	

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/L 0.70 ug/L	0.40U ug/L 0.70U ug/L
TSB-GJ-08-30	Lithium	10.0 ug/L	10.0U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results are not addressed in this report, but will be assessed as part of a separate data usability assessment.

V. ICP Interference Check Sample (ICS) Analysis

Method 200.8 does not specify the ICS QC sample and it has not been a required QC item for historic data. The ICS also would be difficult to apply to analyses which only contain a limited list of analytes, which is true for many of the total and dissolved water samples. The potentially interfering analytes are not all reported and the impact of any ICS outlier would not be traceable using the reported data. The impact of not having the ICS reported is that potentially high analyte interferences would not be monitored and potentially high-biased data would not be identified. This would apply only to samples that are expected to have extremely high levels of cations (e.g., calcium, potassium, iron, aluminum). If these analytes are not high in any given sample, the ICS would not be expected to be applicable.

VI. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits; results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

IX. ICP Serial Dilution

The serial dilution sample is not specified in Method 200.8 and it has not been a required QC item for historic data. The impact of not reporting the serial dilution sample pair is usually that potentially high matrix interferences would not be monitored and potentially high-biased data would not be identified. There can be low biases, but they are not found in the majority of outliers. This would apply only to samples that have analytes reported at greater than 50 x the MDL. Analytes reported below 50 x MDL would not be qualified per the validation guidance.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 60-125%s with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
TSB-GJ-08-20	Scandium-45	127.557 (60-125)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
TSB-GJ-08-30	Scandium-45	129.653 (60-125)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-20 TSB-GJ-08-30	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Internal standards (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/L	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40U ug/L 0.70U ug/L	A
44433	TSB-GJ-08-30	Lithium	10.0U ug/L	A

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites.

Report Date: July 25, 2008

Matrix: Water

Parameters: Mercury by CVAA EPA Method 245.1

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 245.1: Mercury.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following “Reason Codes” will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of > 0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.1 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank. Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results

are not addressed in this report, but will be assessed as part of a separate data usability assessment.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Mercury	125.2 (80-120) -	J+ (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Mercury	140.1 (75-125)	135.4 (75-125)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Mercury	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Mercury	J+ (all detects)	A	Laboratory control sample (%R)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/L	A

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 25, 2008

Matrix: Soil

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories, Inc.

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05
TSB-GJ-08-10MSD	5/12/08	44433-06

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) was analyzed as part of the initial calibration (as acceptable per the method); recoveries were not evaluated or reported by ACZ.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium Mercury	1.3 ug/Kg 1.1 ug/Kg 1.4 ug/Kg 2.7 ug/Kg 8.0 ug/Kg 0.1 ug/Kg	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/Kg	0.2U ug/Kg
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/Kg 0.70 ug/Kg	0.40U ug/Kg 0.70U ug/Kg
TSB-GJ-08-30	Lithium	10.0 ug/Kg	10.0U ug/Kg

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results are not addressed in this report, but will be assessed as part of a separate data usability assessment.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits; results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Sodium and uranium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the RLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
TSB-GJ-08-20	Scandium-45	127.557 (70-130)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
TSB-GJ-08-30	Scandium-45	129.653 (70-130)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20	Antimony Copper	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)

SDG	Sample	Analyte	Flag	A or P	Reason
	TSB-GJ-08-30 TSB-GJ-08-40	Silicon Vanadium Lithium Nickel Tungsten Zinc			
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-20 TSB-GJ-08-30	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Internal standards (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/Kg	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40U ug/Kg 0.70U ug/Kg	A
44433	TSB-GJ-08-30	Lithium	10.0U ug/Kg	A

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites.

Report Date: July 25, 2008

Matrix: Water/Soil

Parameters: Selenium by AA-Hydride (EPA 7742 Modified/SM3114B)

Validation Level: EPA Level IV

Laboratory: ACZ Laboratories

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 7742 Modified: Selenium.

This review follows the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following “Reason Codes” will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (6 months) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of > 0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.1 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Selenium	0.2 ug/L	0.2U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank. Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results

are not addressed in this report, but will be assessed as part of a separate data usability assessment.

IV. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Selenium	125.2 (80-120) -	J+ (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Selenium	140.1 (75-125)	135.4 (75-125)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Selenium	J+ (all detects)	A	Laboratory control sample (%R)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Selenium	0.2U ug/L	A

ATTACHMENT E

Data Validation Report Template for Future Data

Report# ########

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: November 1, 2008

Matrix: Water

Parameters: Mercury by CVAA EPA Method 7470A

Validation Level: EPA Level IV

Laboratory: Microbac

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	5/12/08	44433-01
TSB-GJ-08-20	5/12/08	44433-02
TSB-GJ-08-30	5/12/08	44433-03
TSB-GJ-08-40	5/12/08	44433-04
TSB-GJ-08-10MS	5/12/08	44433-05

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 7470A: Mercury.

This review follows the specific guidance in the QAPP Addendum (MWH 2008) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following “Reason Codes” will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of > 0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.1 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank. Association of results in rinsates samples to field samples and impact of concentrations detected in rinsate samples to field sample results are not addressed in this report, but will be assessed as part of a separate data usability assessment.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Mercury	125.2 (80-120) -	J+ (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value times 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Mercury	140.1 (75-125)	135.4 (75-125)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified

based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Mercury	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Mercury	J+ (all detects)	A	Laboratory control sample (%R)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/L	A

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: November 1, 2008

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: EPA Level IV

Laboratory: Microbac

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	9/15/08	44433-01
TSB-GJ-08-20	9/15/08	44433-02
TSB-GJ-08-30	9/15/08	44433-03
TSB-GJ-08-40	9/15/08	44433-04
TSB-GJ-08-10MS	9/15/08	44433-05
TSB-GJ-08-10MSD	9/15/08	44433-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the specific guidance in the QAPP Addendum (MWH 2008) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium Mercury	1.3 ug/L 1.1 ug/L 1.4 ug/L 2.7 ug/L 8.0 ug/L 0.1 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/L 0.70 ug/L	0.40U ug/L 0.70U ug/L
TSB-GJ-08-30	Lithium	10.0 ug/L	10.0U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% and $\leq$ 35% for soils. For low level results, < 5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits; results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm$10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Sodium and Uranium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the RLs.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field

location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/L	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40U ug/L 0.70U ug/L	A
44433	TSB-GJ-08-30	Lithium	10.0U ug/L	A

Report# #######

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: November 1, 2008

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: EPA Level IV

Laboratory: Microbac

Sample Delivery Group (SDG): 44433

Sample Identification	Collection Date	Laboratory Identification
TSB-GJ-08-10	9/15/08	44433-01
TSB-GJ-08-20	9/15/08	44433-02
TSB-GJ-08-30	9/15/08	44433-03
TSB-GJ-08-40	9/15/08	44433-04
TSB-GJ-08-10MS	9/15/08	44433-05
TSB-GJ-08-10MSD	9/15/08	44433-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

This review follows the specific guidance in the QAPP Addendum (MWH 2008) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium	1.3 ug/L 1.1 ug/L 1.4 ug/L 2.7 ug/L 8.0 ug/L	All samples in SDG 44433

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
	Mercury	0.1 ug/L	

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Mercury	0.2 ug/L	0.2U ug/L
TSB-GJ-08-20	Thallium Tungsten	0.40 ug/L 0.70 ug/L	0.40U ug/L 0.70U ug/L
TSB-GJ-08-30	Lithium	10.0 ug/L	10.0U ug/L

Sample "RINSATE 1" (from SDG 4444120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG 44433

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
TSB-GJ-08-10LCS (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (80-120) 72.5 (80-120) 65.4 (80-120) 68.4 (80-120) - - - -	J- (all detects) UJ (all non-detects)	A

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG 44433)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

Aluminum, calcium, iron, magnesium, manganese, strontium, and titanium results were outside the QC limits; results were not qualified since the original sample (TSB-GJ-08-10) was greater than 4X the spike amount.

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Sodium and Uranium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the RLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
TSB-GJ-08-20	Scandium-45	127.557 (70-130)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
TSB-GJ-08-30	Scandium-45	129.653 (70-130)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Flag	A or P	Reason
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20	Antimony Copper	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)

SDG	Sample	Analyte	Flag	A or P	Reason
	TSB-GJ-08-30 TSB-GJ-08-40	Silicon Vanadium Lithium Nickel Tungsten Zinc			
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
44433	TSB-GJ-08-20 TSB-GJ-08-30	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Internal standards (%R)
44433	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

Metals - Laboratory Blank Data Qualification Summary - SDG 44433

SDG	Sample	Analyte	Modified Final Concentration	A or P
44433	TSB-GJ-08-10	Mercury	0.2U ug/L	A
44433	TSB-GJ-08-20	Thallium Tungsten	0.40U ug/L 0.70U ug/L	A
44433	TSB-GJ-08-30	Lithium	10.0U ug/L	A

ATTACHMENT F

Data Validation EDD Specifications

ATTACHMENT F

DATA VALIDATION EDD FORMAT
SOUTHEAST IDAHO MINE SITES, P4 PRODUCTION, LLC

EDD Field Number	Field Name [1]	Description	Reference [1]
1	INVESTIGATION	Field Activity	NA
2	EDDNAME	Lab SDG Number	NA
3	LABSAMPID	Lab Sample Identifier	ERPIMS 4.0 DLH
4	LOCID	Location Name	ERPIMS 4.0 DLH
5	MATRIX	Sampling Matrix	ERPIMS 4.0 DLH
6	SBD	Sample Beginning Depth	ERPIMS 4.0 DLH
7	SED	Sample Ending Depth	ERPIMS 4.0 DLH
8	LOGDATE	Sample Date	ERPIMS 4.0 DLH
9	LOGTIME	Sample Time	ERPIMS 4.0 DLH
10	LABCODE	USAF Lab Identifier	ERPIMS 4.0 DLH
11	SACODE	Sample Type	ERPIMS 4.0 DLH
12	SAMPNO	Sample Number	ERPIMS 4.0 DLH
13	ANMCODE	Analytical Method Code	ERPIMS 4.0 DLH
14	EXMCODE	Extraction Method Code	ERPIMS 4.0 DLH
15	EXTDATE	Extraction Date	ERPIMS 4.0 DLH
16	EXTTIME	Extraction Time	ERPIMS 4.0 DLH
17	ANADATE	Analysis Date	ERPIMS 4.0 DLH
18	ANATIME	Analysis Time	ERPIMS 4.0 DLH
19	PARLABEL	Parameter Label	ERPIMS 4.0 DLH
20	PARVAL	Measured Concentration	ERPIMS 4.0 DLH
21	UNITS	Units of Measure	ERPIMS 4.0 DLH
22	PARVQ	Parameter Value Qualifier	ERPIMS 4.0 DLH
23	DILUTION	Dilution Factor	ERPIMS 4.0 DLH
24	FLDSAMPID	Field Sample ID	ERPIMS 4.0 DLH
25	RL	Reporting Limit	ERPIMS 4.0 DLH
26	COMPNAME	Compound Name	NA
27	LABLOTCTL	Laboratory Lot Control	ERPIMS 4.0 DLH
28	USEPA FLAG [a]	USEPA Validation Qualifiers	NA
29	REASON CODE [b]	MWH Reason Code	NA
30	FINAL RESULT [c]	Final Analytical Result	NA

[1] References ERPIMS field name; use equivalent GeoTracker EDF field.

[a] Data validator to enter USEPA flags in this field.
[b] Data validator to enter Reason Codes in this field
[c] Field used when data validator changes original result from that reported in laboratory report.

EDD – electronic data deliverable
EDF – Electronic Deliverable Form
ERPIMS – Environmental Resource Program Information Management System
NA – not applicable
USEPA – United States Environmental Protection Agency